1	**Tactical Combat Casualty Care** **November 2010**  **Direct from the Battlefield: TCCC Lessons Learned in Iraq and Afghanistan**	**Direct from the Battlefield: TCCC Lessons Learned in Iraq and Afghanistan**	

2	**TCCC Lessons Learned in Iraq and Afghanistan**
	• Reports from Joint Theater Trauma System (JTTS) weekly Trauma Telecons
	  • Every Thursday morning – worldwide telecon to discuss every serious casualty from that week
	• Published medical reports
	• Armed Forces Medical Examiners Office reports
	• Feedback from doctors, corpsmen, medics, and PJs
	 
		TCCC Lessons Learned in Iraq and Afghanistan
		• **Reports from Joint Theater Trauma System (JTTS) weekly Trauma Telecons**
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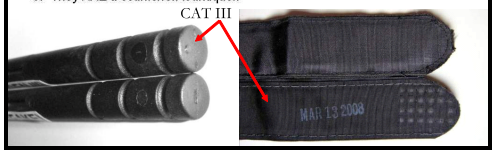
		• **Armed Forces Medical Examiner's Office reports**
		• **Feedback from doctors, corpsmen, medics, and PJs**
			This is the BREAKING NEWS in battlefield trauma care!

3	**Train ALL Combatants in TCCC** · Potentially preventable deaths averaging about 20% of all fatalities · Units that train all members in TCCC have drastically reduced this incidence · Need to train ALL combatants in TCCC 	**Train ALL Combatants in TCCC** • **Potentially preventable deaths averaging about 20% of all fatalities** • **Units that train all members in TCCC have drastically reduced this incidence** • **Need to train ALL combatants in TCCC**	**Some units have almost ELIMINATED preventable deaths by training everyone in TCCC,**
4	**Fatal Extremity Hemorrhage** This casualty was wounded by an RPG explosion and sustained a traumatic amputation of the right forearm at the mid-forearm level and a right leg wound. He bled to death from his leg wound despite the placement of three field-expedient tourniquets. What could have saved him C.A.T. Tourniquet TCCC training for all unit members *Note: Medic killed at onset of action 	**Fatal Extremity Hemorrhage** **This casualty was wounded by an RPG explosion and sustained a traumatic amputation of the right forearm at the mid-forearm level and a right leg wound. He bled to death from his leg wound despite the placement of three field-expedient tourniquets.** **What could have saved him** **C.A.T. Tourniquet** **TCCC training for all unit members** ***Note: Medic killed at onset of action**	This kind of event can be prevented with good TCCC training for everyone in the unit. **TCCC – it's not just for medics and corpsmen anymore!**

5	**Tourniquets** · Get tourniquets on BEFORE onset of shock · Mortality is very high if casualties already in shock before tourniquet application · If bleeding is not controlled and distal pulse not eliminated with first tourniquet – use a second one just proximal to first · Increasing the tourniquet WIDTH with a second tourniquet controls bleeding more effectively and reduces complications 	**Tourniquets** • **Get tourniquets on BEFORE onset of shock** ○ **Mortality is very high if casualties already in shock before tourniquet application** • **If bleeding is not controlled and distal pulse not eliminated with first tourniquet – use a second one just proximal to first** ○ **Increasing the tourniquet WIDTH with a second tourniquet controls bleeding more effectively and reduces complications**	COL John Kragh from the Army Institute of Surgical Research – 3 great tourniquet papers Journal of Trauma 2008 Annals of Surgery 2009 Journal of Emergency Medicine 2009
6	**Tourniquet Case Report** **Afghanistan – Nov 2009** · Soldier with gunshot wound to left leg · Open fracture left femur · Injury to popliteal artery and vein · Three CAT tourniquets placed · Life saved · Leg doing well · 2-3 casualties/week being saved with tourniquets 	**Tourniquet Case Report** **Afghanistan – Nov 2009** • **Soldier with gunshot wound to left leg** • **Open fracture left femur** • **Injury to popliteal artery and vein** • **Three CAT tourniquets placed** • **Life saved** • **Leg doing well** • **2-3 casualties/week being saved with tourniquets**	Tourniquets are saving lives on the battlefield EVERY WEEK.

7	**Tourniquets** • Tighten velcro band on tourniquets as tight as possible before starting to use windlass – a loose velcro band contributes to tourniquet malfunction • Should be effective with approximately three 180 degree turns of windlass • Use second tourniquet as needed 	**Tourniquets** • **Tighten velcro band on tourniquets as tight as possible before starting to use windlass – a loose velcro band contributes to tourniquet malfunction** ○ **Should be effective withapproximately three 180 degree turns of windlass** ○ **Use second tourniquet as needed**	Common tourniquet mistake – not getting the velcro band tight before starting to crank the windlass.
8	**Tourniquets** • Fake CAT tourniquets that are prone to malfunction are turning up in theater – ensure that you have this NSN tourniquet: • NSN 6515-01-521-7976 	**Tourniquets** • **Fake CAT tourniquets that are prone to malfunction are turning up in theater – ensure that you have this NSN tourniquet:** • **NSN 6515-01-521-7976**	Make sure you have the right tourniquets!

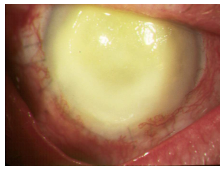
9	**Counterfeit CAT Tourniquets** **DEFENSE LOGISTICS AGENCY** DEFENSE SUPPLY CENTER PHILADELPHIA 700 ROBBINS AVENUE PHILADELPHIA, PENNSYLVANIA 19111-5092 IN REPLY REFER TO DSCP-FSFB 10-150 April 14, 2010 MEMORANDUM FOR USAMMA, NAVMEDLOGCOM, AFMLO, MARCORSYSCOM, DMMPO, SUBJECT: QUALITY ASSURANCE URGENT PRODUCT SAFETY ALERT. 1. REFERENCES: A. ITEM: Tourniquet, Nonpneumatic, C-A-Tourniquet®, NSN 6515-01-521-7976, B. Item No(s): NAR-CAT, 30-0001 Serial/Lot No(s): N/A C. Manufacturer: Composite Resources, Inc., 485 Lakeshore Parkway, Rock Hill, SC D. Distributors: North American Rescue Inc., 35 Tedwall Court, Greer, SC; Cardinal Health, 1430 Waukegan Road, McGaw Park, IL; Owens and Minor, 9120 Lockwood Blvd, Mechanicsville, VA; American Purchasing Services (DBA American Medical Depot) 4380 NW 135th St, Opa Locka, FL; Phoenix Textile Corporation, 21 Commerce Drive, O'Fallon, MO. E. Authorized for procurement through DoD Supply Chain Only. 2. SAFETY ALERT: CRITICAL LIFE-SAVING ITEM.	**Counterfeit CAT Tourniquets**	Message from Defense Logistics Agency outlining problem This letter lists authorized CAT tourniquet distributors
10	**Counterfeit CAT Tourniquets** 2. SAFETY ALERT: CRITICAL LIFE-SAVING ITEM. A. REASON: DLA has become aware of similar products manufactured to closely resemble the C-A-Tourniquet® and available for purchase through non-DoD websites. Authorized DoD procurement gateways will supply only the approved commercial part from authorized distributors. These products were first encountered several years ago in a depot in Afghanistan and thought to have been purged from the system. They were then of obvious inferior construction and quite recognizable as a substitute for the real thing. Today the product is very difficult to distinguish from the C-A-Tourniquet® down to duplicate markings and symbols. Although there is no direct evidence against these duplicate products, several reports indicate that they are of inferior design and may cause serious injury or death. B. RECOMMENDED STRATEGY: The above distributors, supplying the Composite Resources product exclusively, are the only authorized source for this device. The FDA regulates this product as a Class 1 device, which means that there is no requirement for a premarket notification application and FDA clearance is not required before marketing the device in the U.S. However, these manufacturers are required to register their establishment with FDA. If you have purchased these devices from any other source, it is recommended that they be suspended from use and replaced by the recommended product. Please report suspended quantities to your logistical supply office. Some examples of non-authorized Internet sources for duplicate product that may be hazardous are: www.world-element.com, ID No. EX 159, and http://www.airsoftglobal.com/product_info.php?products_id=11464, ID EL-ACC-EX159-AG.	**Counterfeit CAT Tourniquets**	Fake tourniquets are of inferior design and may not work May be hard to distinguish from real CAT
11	CAT (GEN III) vs. F-CAT **Executive Summary** **Introduction:** 1. The Element Cat (E-CAT) is a very carefully made counterfeit CAT tourniquet. 2. It is manufactured in Hong Kong for $8.50 (USD) per item. 3. There are no limits to the number that can be purchased. 4. They are available on the internet, and anyone can purchase them. 5. They were designed to look, feel and act like a CAT (GEN III). 6. They ARE a counterfeit tourniquet.  	**Introduction:** 1. The Element Cat (E-CAT) is a very carefully made counterfeit CAT tourniquet. 2. It is manufactured in Hong Kong for $8.50 (USD) per item. 3. There are no limits to the number that can be purchased. 4. They are available on the internet, and anyone can purchase them. 5. They were designed to look, feel and act like a CAT (GEN III). 6. They ARE a counterfeit tourniquet.	Fake CATs made in Hong Kong Here are some ways to tell them apart Date stamp on real CAT Generation III tourniquets is a good way

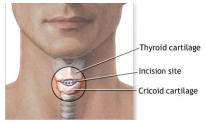
12	CAT (GEN III) vs. F-CAT **Executive Summary** **CAT (GEN III)** Package from NARP, Inc. Looks nothing like the F-CAT package. **E-CAT:** Packaged in plastic bag with paper top. The sticker on the bag call the tourniquet the "Combat Application Tourniquet" and lists the NSN assigned to NARP. CAT E-CAT 	**CAT (GEN III)** Package from NARP, Inc. Looks nothing like the F-CAT package. **E-CAT:** Packaged in plastic bag with paper top. The sticker on the bag call the tourniquet the "Combat Application Tourniquet" and lists the NSN assigned to NARP. CAT E-CAT 	It's much easier to spots the fakes if they are still in the wrapper! Totally different packaging
13	**CAT Generation VI** 10/06/2009 Length of Tourniquet changed to 37 ½" Manufacturer and Lot Stamp with date manufactured added to the strap  	**CAT Generation VI** 10/06/2009 Length of Tourniquet changed to 37 ½" Manufacturer and Lot Stamp with date manufactured added to the strap  	New Generation VI CAT has the white time band Also a new manufacturer and date stamp

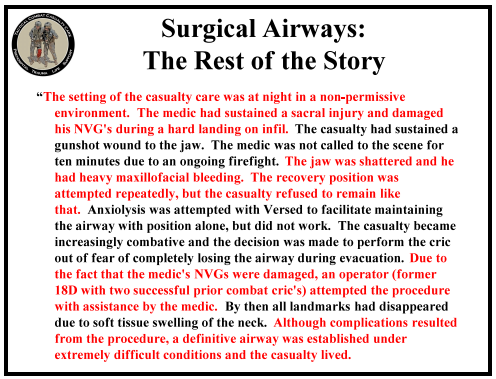
14	**Ft. Hood Shootings 2009** **Officer Kim Munley** · 12 dead; 31 wounded on 5 Nov 09 · Officer Munley got shooter; shot in both thighs · Direct pressure and makeshift tourniquets used by several physicians unsuccessful at controlling hemorrhage – went into shock · Saved by Army 68W medic with a CAT tourniquet on left thigh 	**Ft. Hood Shootings 2009** **Officer Kim Munley** • **12 dead; 31 wounded on 5 Nov 09** • **Officer Munley got shooter; shot in both thighs** • **Direct pressure and makeshift tourniquets used by several physicians unsuccessful at controlling hemorrhage – went into shock** • **Saved by Army 68W medic with a CAT tourniquet on left thigh**	Officer Kim Munley – Hero of Fort Hood Shootings Shot in leg – femoral bleeding Direct pressure had failed and she was going into shock Saved by Army medic who used a CAT

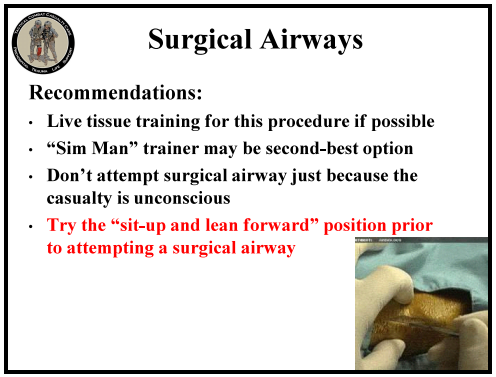
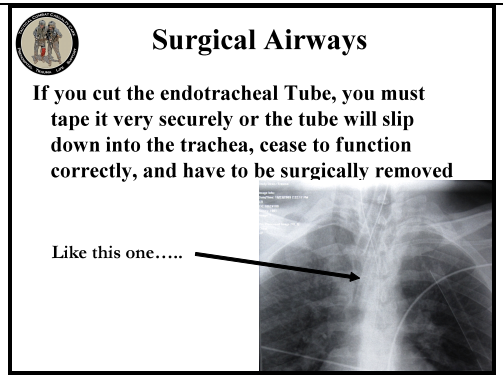
15	**Tourniquet on Uninjured Arm**
	· JTTS Trauma Telecon 8 April 2010
	· IED casualty
	· Arrived at Kandahar with CAT in place on left arm
	· Evaluation: no injuries sustained on left arm
	· Follow-up: No explanation available
	· Lessons Learned:
	  · No injury – No tourniquet
	  · Remember to reassess your casualties
		Tourniquet on Uninjured Arm
		• **JTTS Trauma Telecon 8 April 2010**
		• **IED casualty**
		• **Arrived at Kandahar with CAT in place on left arm**
		• **Evaluation: no injuries sustained on left arm**
		• **Follow-up: No explanation available**
		• **Lessons Learned:**
		  ○ **No injury – No tourniquet**
		  ○ **Remember to reassess your casualties**
			This mistake could have been avoided if the casualty had been reassessed in TFC

16	**Wear Your Eye Protection!** • Jan 2010 • 22 y/o near IED without eye protection • Now blind in both eyes • Don't let this happen to you – see slides below  With eye pro – eyes OK  Without eye pro – both eyes being removed	**Wear Your Eye Protection!** • **Jan 2010** • **22 y/o near IED without eye protection** • **Now blind in both eyes** • **Don't let this happen to you – see slides below**	**Prevention, prevention, prevention……**
17	**Penetrating Eye Trauma** • Rigid eye shield for obvious or suspected eye wounds - often not being done – SHIELD AND SHIP! • Not doing this may cause permanent loss of vision – use a shield for any injury in or around the eye • Eye shields not always in IFAKs  Shield after injury  No shield after injury	**Penetrating Eye Trauma** • **Rigid eye shield for obvious or suspected eye wounds - often not being done – SHIELD AND SHIP!** • **Not doing this may cause permanent loss of vision – use a shield for any injury in or around the eye** • **Eye shields not always in IFAKs**	The eye on the left has a good chance of recovering vision. The eye on the right will have to be surgically removed.
18	**Eye Protection**   • Use your tactical eyewear to cover the injured eye if you don't have a shield. • Using tactical eyewear in the field will generally prevent the eye injury from happening in the first place!	**Eye Protection** • **Use your tactical eyewear to cover the injured eye if you don't have a shield.** • **Using tactical eyewear in the field will generally prevent the eye injury from happening in the first place!**	Tactical eyeware can be used to protect the eye if no eye shield is available. Use of tactical eyeware is an excellent way to prevent this type of injury from happening in the first place.

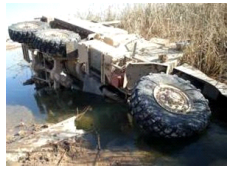
19	**JTTS Trauma Telecon** **9 Sept 2010** • Recent case of endophthalmitis • Reminder – shield and moxifloxacin in the field for penetrating eye injuries • Also – need to continue moxi both topically and systemically in the MTFs • Many antibiotics do not penetrate well into the eye 	**JTTS Trauma Telecon** **9 Sept 2010** • **Recent case of endophthalmitis** • **Reminder – shield and oxifloxacin in the field for penetrating eye injuries** • **Also – need to continue moxi both topically and systemically in the MTFs** • **Many antibiotics do not penetrate well into the eye**	Eye infections can cause permanent loss of vision after eye injury. Give antibiotics in the Combat Pill Pack to help prevent!
20	**Patched Open Globe** **22 July 2010** • Shrapnel in right eye from IED • Had rigid eye shield placed • Reported as both pressure patched and as having a gauze pad placed under the fox shield without pressure • Extruded uveal tissue noted at time of operative repair of globe • No gauze! COL Robb Mazzoli: Gauze can adhere to iris tissue and cause further extrusion when removed even if no pressure is applied to eye.	**Patched Open Globe** **22 July 2010** • **Shrapnel in right eye from IED** • **Had rigid eye shield placed** • **Reported as both pressure patched and as having a gauze pad placed under the fox shield without pressure** • **Extruded uveal tissue noted at time of operative repair of globe** • **No gauze! COL Robb Mazzoli: Gauze can adhere to iris tissue and cause further extrusion when removed even if no pressure is applied to eye.**	COL Robb Mazzoli is the Army Surgeon General's Consultant for Ophthalmology Reminder: Rigid eye shields GOOD, pressure patch BAD for eye trauma No gauze underneath the shield at all – may cause problems as noted above

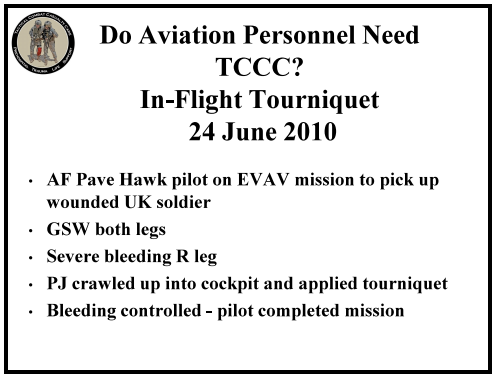
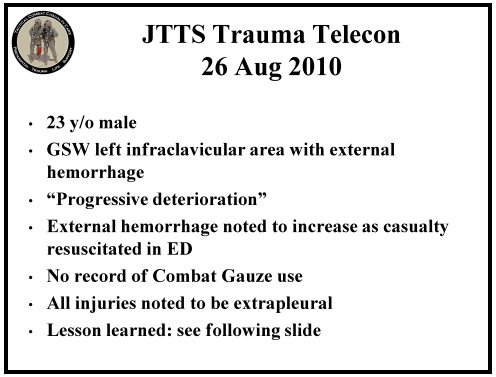
21	**Surgical Airways** **Joint Theater Trauma System Email 24 September 09** • **3 field crics done incorrectly in OIF** • **One through center of thyroid cartilage and through one of the vocal cords**  	**Surgical Airways** **Joint Theater Trauma System Email 24 September 09** • **3 field crics done incorrectly in OIF** • **One through center of thyroid cartilage and through one of the vocal cords**	Surgical airways are probably the most technically difficult intervention in TCCC. There have been some done incorrectly.

22		**Surgical Airways:** **The Rest of the Story** **"The setting of the casualty care was at night in a non-permissive environment. The medic had sustained a sacral injury and damaged his NVG's during a hard landing on infil. The casualty had sustained a gunshot wound to the jaw. The medic was not called to the scene for ten minutes due to an ongoing firefight. The jaw was shattered and he had heavy maxillofacial bleeding. The recovery position was attempted repeatedly, but the casualty refused to remain like that. Anxiolysis was attempted with Versed to facilitate maintaining the airway with position alone, but did not work. The casualty became increasingly combative and the decision was made to perform the cric out of fear of completely losing the airway during evacuation. Due to the fact that the medic's NVGs were damaged, an operator (former 18D with two successful prior combat cric's) attempted the procedure with assistance by the medic. By then all landmarks had disappeared due to soft tissue swelling of the neck. Although complications resulted from the procedure, a definitive airway was established under extremely difficult conditions and the casualty lived.**	Another dramatic example of how difficult it can be to provide trauma care on the battlefield.

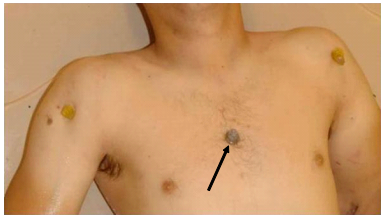
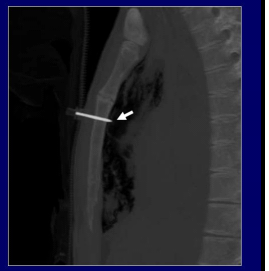
23		**Surgical Airways** **Recommendations:** • **Live tissue training for this procedure if possible** • **"Sim Man" trainer may be second-best option** • **Don't attempt surgical airway just because the casualty is unconscious** • **Try the "sit-up and lean forward" position prior to attempting a surgical airway**	The "Sim Man" trainer is the device used to train Army 68W medics in surgical airways
24		**Surgical Airways** **If you cut the endotracheal Tube, you must tape it very securely or the tube will slip down into the trachea, cease to function correctly, and have to be surgically removed**	Read text

25	**IED Casualties**
	• IED blast casualties often have multiple mechanisms of injury
	  • Blunt trauma
	  • Penetrating trauma
	  • Blast
	  • Burns
	• Majority of casualties are now from IEDs
	 
		IED Casualties
		• **IED blast casualties often have multiple mechanisms of injury**
		  • **Blunt trauma**
		  • **Penetrating trauma**
		  • **Blast**
		  • **Burns**
		• **Majority of casualties are now from IEDs**
			Mechanisms of wounding have changed with the increasing use of IEDs.
			
			Casualties from IED attacks often have more than just penetrating trauma.

26	**IED Casualties** • IED casualties – many have spinal fractures, especially thoracic • Try to maintain spinal alignment in blunt trauma casualties 	**IED Casualties** • **IED casualties – many have spinal fractures, especially thoracic** • **Try to maintain spinal alignment in blunt trauma casualties**	This may be done by a second rescuer manually maintaining head and neck alignment if needed.
27	**IED Casualties** • IED events – be alert for secondary IEDs or ground assaults after initiation of the IED 	**IED Casualties** • **IED events – be alert for secondary IEDs or ground assaults after initiation of the IED**	**Use of a second IED is a common tactic.** **Move the casualties "Off the X."**

28		**Do Aviation Personnel Need TCCC?** **In-Flight Tourniquet 24 June 2010** • **AF Pave Hawk pilot on EVAV mission to pick up wounded UK soldier** • **GSW both legs** • **Severe bleeding R leg** • **PJ crawled up into cockpit and applied tourniquet** • **Bleeding controlled - pilot completed mission**	Yes, they do. Especially helicopter crews.
29		**JTTS Trauma Telecon** **26 Aug 2010** • **23 y/o male** • **GSW left infraclavicular area with external hemorrhage** • **"Progressive deterioration"** • **External hemorrhage noted to increase as casualty resuscitated in ED** • **No record of Combat Gauze use** • **All injuries noted to be extrapleural** • **Lesson learned: see following slide**	Read text

30	**Combat Gauze**  **It doesn't work if you don't use it.**	**Combat Gauze** **It doesn't work if you don't use it.**	Read text
31	FEEDBACK TO THE FIELD: Perforation of the Sternum by an Intraosseous Infusion Device H T Harcke, COL, MC, USA Chief, Forensic Radiology Armed Forces Institute of Pathology E Mazuchowaski, Lt Col (Sel), USAF, MC Deputy Medical Examiner Office of the Armed Forces Medical Examiner	Feedback to the Field Perforation of the Sternum by an Intraosseous Infusion Device	Some Lessons Learned come from autopsy findings Strong work done by Drs Harcke and Mazuchowaski to get word out to combat forces
32	CASE OVERVIEW • IED detonated in the decedent's vicinity. • Catastrophic injury to the lower extremities and pelvis, to include traumatic amputation of the lower legs. • Emergency treatment included tourniquets, sternal IO-IV, and proximal humeral IO-IV's.	Case Overview IED detonated in the decedent's vicinity Catastrophic injury to the lower extremities and pelvis, to include traumatic amputation of the lower legs Emergency treatment included tourniquets, sternal IO-IV, and proximal humeral IO-IVs	Read casualty scenario

33	 Note sternal IO in place	**Note sternal IO in place**	Note sternal IO
34	**Autopsy CT Scan** Sagittal MDCT image shows the IO-IV needle passes through the sternum with the tip in the anterior mediastinum (arrow).  **This is NOT where you want the infused fluids to go!**	Autopsy CT Scan Sagittal MDCT image shows the IO needle passes through the sternum with the tip in the anterior mediastinum (arrow). This is NOT where you want the infused fluids to go!	Infused fluids in this case went INTO THE CHEST CAVITY. NOT GOOD!
35	Comparison of the devices: Note size, color and packaging differences.    **Do you really want to try to tell these two IO needles apart in the dark in a tactical mass casualty scenario?**	**Do you really want to try to tell these two IO needles apart in the dark in a tactical mass casualty scenario?**	**Yes they are clearly marked, but don't forget about night-time operations.** **Also the confusion and urgency of a mass casualty scenario in the field**.

36	 Questions?		